Remarks

Amendments have been made to the specification to include serial numbers of referenced applications and make some corrections where appropriate.

The claims have been amended to better define the invention as set forth particularly with reference to Figures 10, 18, 19 and 20 and to allow for the ranges in temperature values set forth on pages 50, 51. In amending the claims, account has been taken of the Examiner's objections to the original claims regarding wording, antecedents and the like.

FTIR is a well known acronym for Fourier Transform Infrared Spectroscopy, and this has been spelt out in full in claim 20.

The object of the invention as evident from the title is to produce stress-relieved optical quality components for use in photonics applications. Such components typically have a buffer, core and cladding layer. There are numerous problems associated with producing such components, including elimination of optical absorption in the waveband of interest, elimination of wafer warp, and elimination of undue mechanical stress because deposition of the different layers creates different stress conditions.

The present invention provides a way to obtain such components wherein the wafer is subjected to two thermal treatments. In the first step, the first structure consisting of the buffer, with a compensating buffer layer on the back face of the wafer, is subjected to a first treatment which reduces optical absorption and reduces compressive stress, typically from a value of - 250 MPa after PECVD deposition down to about - 150 MPa after the treatment. Subsequently, the core layer is deposited by PECVD, which puts the structure into tensile stress, and the second structure is subjected to a similar treatment, which as shown in Figure 10 reduces the typical tensile stress down to about 40 Mpa.

There are of course many thermal treatments in the prior art to which components of this nature are subjected, and many involve ramping up to a predetermined constant temperature. Ohja is an example of one such process, wherein the planar waveguide layer is annealed to remove structural imperfections. Ohja does not teaches that the maximum temperature be maintained for 30 to 300 seconds, whereas the minimum time required to achieve stress relief in accordance with the invention (see paragraph [00234]) is 30 minutes. Ohja does not disclose the use of a

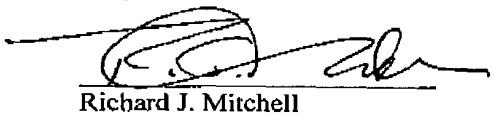
backside compensating buffer layer to reduce wafer warp during the necessary heat treatment. While this feature is disclosed in applicant's co-pending application 09/799,491, it does not so far as the applicant is aware form part of the state of the art, and is claimed in the present application in conjunction with the two heat treatments that all components to be produced in which the final stress is a very acceptable 40 MPa.

The invention resides in the combination of steps as claimed and which take advantage of the graphs shown in Figure 10 showing the changes in compressive and tensile stress with temperature, along with the concomitant reduction in optical absorption at the sustained maximum temperature to achieve a high quality component with good absorption characteristics. In the preferred embodiments the PECVD layers are deposited by techniques described in the co-pending applications incorporated by reference in order to minimize the temperature needed to reduce optical absorption down to around 900°.

It is believed that the combination of steps as now claimed is neither taught nor suggested in the prior art.

Reconsideration and allowance are respectfully requested.

Respectfully submitted,



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